Defense Standardization Program
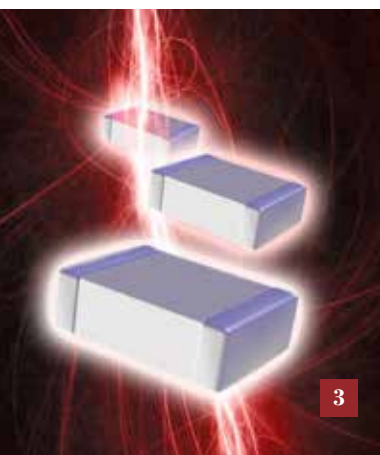# Journal

Agency Standardization

Army Standardization Activities and Initiatives

Plans for the Air Force Standardization Program

Standardization and NSN Data Cleansing:
Land and Maritime Effort Streamlines Procurements

Geospatial Intelligence Standards

Contents *October/December 2016*

The *DSP Journal* is available only in electronic form.

To receive issues, please subscribe at the DSP website, **www.dsp.dla.mil**,
or e-mail DSP-Editor@DLA.mil and put "Subscribe" in the subject line.

Gregory E. Saunders
Director, Defense Standardization Program Office

Nicole Dumm
Editor, Defense Standardization Program Journal

Defense Standardization Program Office
8725 John J. Kingman Road, STOP 5100
Fort Belvoir, VA 22060-6220

703-767-6888
Fax 703-767-6876

dsp.dla.mil

Director's Forum

This issue of the *Defense Standardization Program Journal* focuses on agency standardization. I had planned to write a Director's Forum pointing out how, even though the Defense Standardization Program is huge, it is still only one piece of a much larger system that includes standards programs from many of our sister agencies such as NASA, GSA, DoT, DHS, VA, DoE, and many others. And this is good message to remember. But as I represented the United States at a NATO meeting on standardization a couple of weeks ago, and I listened to the Director General of the International Military Staff (IMS) make comments about standardization, I changed my mind about what I wanted to talk about in this *Journal*.

People involved in the standardization enterprise have an inferiority complex—we believe that our stuff is not sufficiently important to the "powerful people." I know that during my nearly 40-year career we have tried many times to get people at the political appointee level to recognize the importance of standards and standardization. Today, in the U.S. Department of Defense, we are fortunate to have great recognition and support up the command structure of the Assistant Secretary of Defense for Research and Engineering and even to the Under Secretary for Acquisition, Technology and Logistics. This has not always been true in DoD and is not necessarily true in other U.S. agencies or in the Ministries of Defense of some of our allies. But we got a real boost in the international community at the late November meeting of NATO's Committee on Standardization.

I was pleasantly surprised (you may read that as "thunderstruck") to hear the Netherlands Army's three-star general, Director General of the IMS, speaking eloquently and at length about the importance to the NATO Military Alliance of standards and standardization. Lieutenant General Jan Broeks said that standardization within NATO is one of the crucial activities that connects military planners to the technology that is absolutely essential to maintaining connectivity on the battlefield and to maintaining technological superiority over our enemies.

Gregory E. Saunders
Director
Defense Standardization Program Office

He acknowledged that standardization is rarely cited for what it accomplishes in terms of facilitating interoperability—instead it is lack of standardization that is cited for failures to be able to accomplish some aspect of a mission. There's good news in that acknowledgement. First, it is good news that it doesn't happen all that often;

second, the failure is often in the implementation, or lack thereof, rather than any lack of an agreement to standardize; and third—perhaps most importantly—is that standardization is seen as a solution.

While I cannot go into any specifics here, General Broeks cited instances that became apparent during recent actions and exercises that highlighted failures to communicate adequately due to either a lack of standardization solutions or from failure to fully implement the standards that exist. Indeed, when it comes to the attention of a three-star general that mission accomplishment, in either live action or in exercises, is being hindered because of a lack of interoperability, it is time for our community to sit up and take notice. We need to celebrate our successes, but more to the point, we need to see what can be done to eliminate even those few, rare instances of failure.

General Broeks cited two main issues—responsiveness to operational needs by the standardization community and failure to implement standardization agreements. He asked those sitting at the table at the Committee to become aggressive proponents for implementation of our standardization agreements. It does little good, in fact it wastes resources, for us to develop standards that we fail to implement.

But he also asked those of us at the table to find ways to be more responsive to the operational needs of our warfighters and peacekeepers when those needs are identified through hard lessons learned. He asked us to focus on three specific areas. While he directed his remarks to development of NATO standardization documents—the points are universal. He first asked (challenged) that we reduce the number of individual decision points where broad consensus must be accomplished before we are allowed to move to the next step. While recognizing the strength of consensus, he said that having to seek that consensus at too many intermediate points drags down productivity and slows the process to an unacceptable degree. Yes—let's have consensus that this is something we want to work on, and again when we've completed the work. But let's leave mid-milestones to the subject matter experts involved in putting fingers to keyboards.

Secondly he asked us to recognize that a one-size-fits-all process is not sufficiently responsive to meet urgent needs and to document fast-moving technology. We must avoid having everything become a priority, lest we have *no* priorities. However, when something really is urgent, we need an out-of-the-box way to deal with it—to get it done in time to do some good.

Lastly he asked us to put more faith in those subject matter experts to not only define the technical parameters and to make tough decisions, but also to set their own timelines for accomplishment. In NATO our guiding procedural document currently provides timelines that are ridiculously short for some activities, and equally ridiculously long for others. Rigid timelines for development of documents with an incredibly wide diversity of complexity and urgency simply don't make sense.

In the end what he was really asking was for us to ensure our relevance to war-planning and war-fighting by trusting our experts more and providing greater flexibility to increase agility and the speed with which we resolve standardization and interoperability failures.

He finished his remarks talking about the necessity of day-zero interoperability. It is not acceptable to go to battle with the mindset that we can fix things later, we can always re-coordinate that document and maybe we'll get consensus next year. Wars, battles, relief missions, and peacekeeping operations are come-as-you-are affairs. Interoperability failures on day zero are just failures. The standardization community works tirelessly to try to put in place solutions to potential interoperability failures before we need them so that we achieve day-zero interoperability. General Broeks' remarks were inspiring. They were a very cogent reminder of what we're doing here. We can have no more excuses—we have to get to work.

Army Standardization Activities and Initiatives

By Wade Schubring
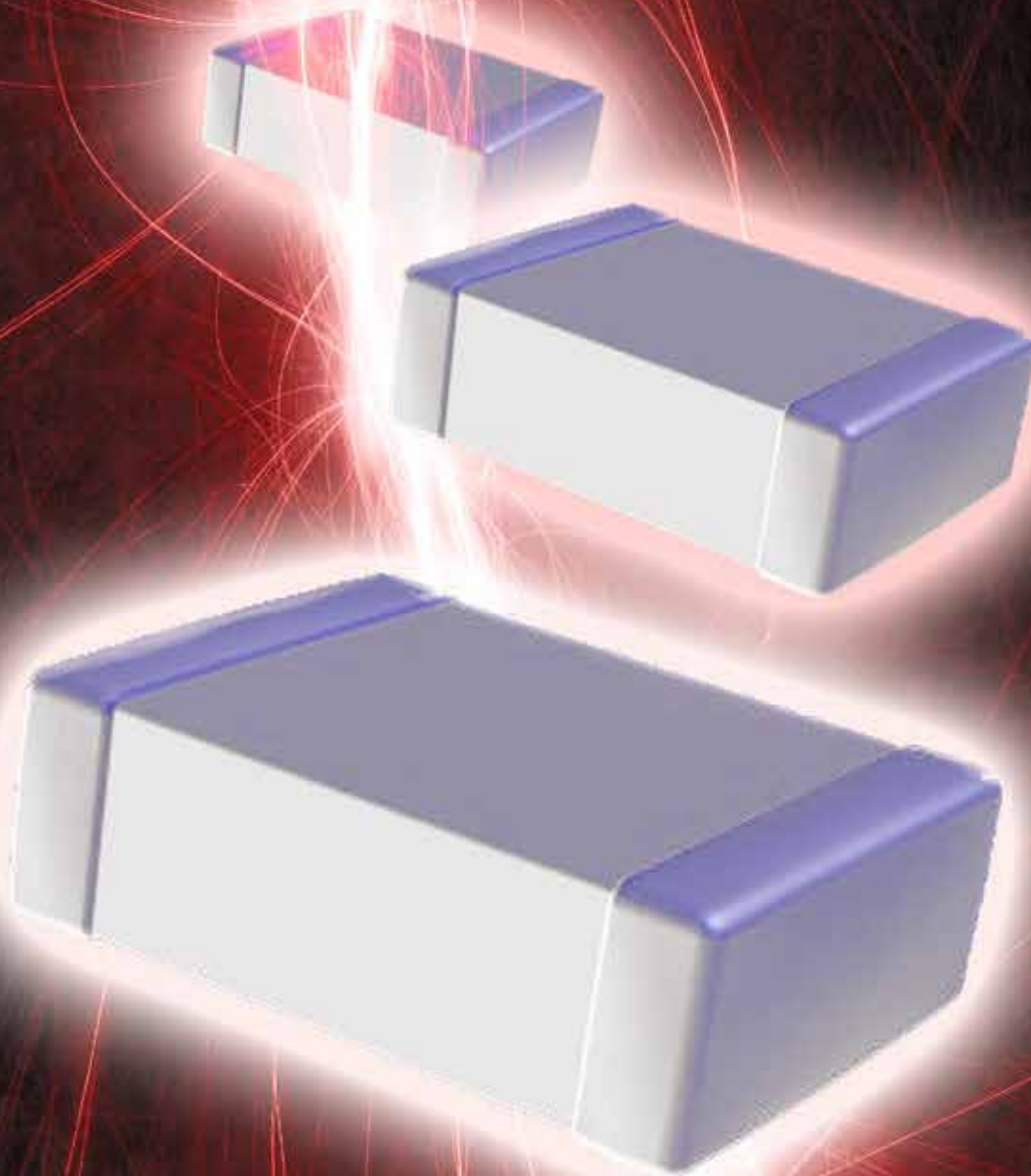
The Army Standardization Program (ASP) is one piece of the Defense Standardization Program that was created by congressional mandate. The program ensures that materiel standardization, including information technology and facilities, is addressed throughout the acquisition process. The ASP supports warfighters by ensuring their equipment is interoperable, reliable, technologically superior, and affordable. It also ensures interoperability within the DoD services and multinational partners; informational superiority via standardized data and equipment interfaces; and rapid new technology insertion through standard interfaces and performance requirements.

The ASP comprises more than 30 different preparing activities (PAs) that oversee standardization over hundreds of different product lines and technologies, which are divided via standardization areas, federal supply group, and federal supply classifications. The PAs are assigned these areas based on their technical expertise residing within each specific organization. The Army has a broad base of product lines and technologies from the well-known areas of Army weapon and soldier systems (armored and combat vehicles, ammunition, small arms, helicopters, etc.), to publishing, heraldry, and packaging, to new technologies in materials, medical, and communication.

The overall management, administration, and oversight of the Army's program are within the Army Materiel Command, where the Army standardization executive and the Army's departmental standardization officer (DepSo) are located. The majority of the standardization execution is within the Army's Research, Development and Engineering Centers (RDECs) and other Army research and support organizations. Following is a broad-brush look at the Army's Standardization Program, from what day-to-day activities worked within the various organizations to specific examples of what has been accomplished.

Communications-Electronics Research, Development and Engineering Center

The Communications-Electronics Research, Development and Engineering Center (CERDEC) provides standardization support that is critical to readiness and sustainment as DoD continues to rely on legacy systems and emerging technologies in support of the warfighter. CERDEC standardization activities include maintenance of current documents as well as development of new standardization documents. The maintenance and development of these documents is often performed with DoD partners in a teaming and working group arrangement.

CERDEC teams with the Defense Logistics Agency Land and Maritime for many Communications-Electronics Command specifications by maintaining these specs, managing the associated qualification programs, and coordinating with industry and government to discuss needs and challenges and recommend changes, such as the creation of specifications for updated surface-mounted radio frequency coils and smaller ceramic chip capacitors that will reduce size, weight, power, and cost requirements for C4ISR systems.

CERDEC also represents Army C4ISR expertise in multi-service working groups for document development. CERDEC has used its C4ISR engineering expertise and lessons learned to facilitate completion of the Air Force handbook *Manufacturing Management Program Guide*, so it can be used as guidance for implementing a DoD Manufacturing Management Program (SAE AS6500). It has supported the Navy in equipment specification reviews for shipboard power switch gears and cable lace and tools. CERDEC supported the Defense Threat Reduction Agency Working Group for the development of two classified satellite standards for satellite survivability, providing feedback to improve survivability, protection, and sustainability of satellite systems in natural and nuclear environments.

Army Research Lab

The Army Research Lab (ARL) Specifications and Standards Office (S&SO) has been in existence for approximately 70 years, and it is the Army's lead laboratory for materials research and development. Therefore, the ARL S&SO focuses mainly on materials and material processes including work with armor materials (ferrous materials, ceramics, composites, metal and nonmetal spray, and the newer lightweight aluminum alloys, magnesium alloys, and titanium). ARL is the PA for approximately 90 percent of the armor material specifications (ferrous and nonferrous) for all armored vehicles and platforms. Another important area of research and test are coatings, including chemical agent resistant coatings.

ARL worked to develop a manufacturing process known as "Cold Spray," a materials deposition technique by which particles of metals, nonmetals, or both, propelled by a high-velocity jet of gas, are used to build up a coating or a free-standing structure by means of ballistic impingement upon a substrate. ARL developed two standards for the implementation and use of this valuable technique (MIL-STD-3021, "Materials Deposition, Cold Spray," and MIL-DTL-32495, "Aluminum-Based Powders for Cold Spray Deposition"). Cold Spray will allow the reclamation of existing parts during overhaul and repair, and with a small investment, the Army will recover millions of dollars in cost

avoidance savings by not having to purchase new parts. Examples include saving an estimated 75 percent of the cost of overhauling and repairing the UH-60 main transmission and tail rotor gearbox housing assemblies, repair of the A-64 Apache mast support, and restoration of magnesium transmission gearboxes of the UH-60 Blackhawk.

When procurement problems occurred in the areas of ballistic fabric and composite armor laminates, a quick review by ARL revealed the problem: three standards documents required a complete makeover. ARL worked with the RDEC organizations to revise the documents, and the revisions now give both U.S. government (Tank Automotive Research, Development and Engineering Center and Tank-Automotive Command) and industry (original equipment manufacturers such as Oshkosh, BAE, General Dynamics, FPI, and IMG) the ability to order specific panel materials. With materiel controls in place, it ensures that troop survivability will be provided to the same level as was qualified previously during government testing. There are already documented events in which the improvement in survivability has been confirmed. The cost savings associated with lives saved are difficult to estimate.

Logistics Support Activity

The mission of the Logistics Support Activity (LOGSA) in the area of *technical publications standardization* adapts technical manuals to meet the needs of the soldier in today's battlefields. For many years, LOGSA has been spearheading the development of requirements to standardize electronic technical manuals (ETMs) and interactive electronic technical manuals (IETMs) to provide soldiers with manuals that have a common look and feel. The requirements are contained in MIL-STD-40051-1/-2, the premiere standard for Army technical manuals and its associated document type definitions and style sheets. In recent years, LOGSA has also begun using ASD S1000D and have developed Army business rules (MIL-STD-3031). As a result of advances in technology and the changing needs of soldiers, several issues requiring the development of new requirements and capabilities have been identified. LOGSA is enforcing Extensible Markup Language tagging of all data and is working to develop or improve IETM download capabilities, develop near-real-time update capability via ETMs Online, provide requirements for smaller-screen devices, develop requirements for weapon system software manuals, and add requirements for other types of publications such as hand receipts, technical bulletins, and ammunition data sheets to MIL-STD-40051 and MIL-STD-3031. All of these efforts will enable soldiers to have more complete, more robust, and more up-to-date manuals that can viewed on whatever devices the soldier uses, which will improve readiness and make operation and maintenance of Army equipment easier and faster.

The *Logistics Engineering Division* (LED), with over 50 years of experience in providing product life-cycle support, has a rich history and a legacy of expertise. In fact, SAE GEIA-STD-0007 is the primary standard by which the Army Enterprise Resource Planning initiatives are obtaining their

data deliverables. LED's mission is to support and sustain product support standards activities and engage at all levels with the domestic and international organizations that develop logistics standards important to the Army, DoD, and our allies. With leadership roles on boards, committees, and working groups, through key organizations such as SAE International and the International Organization for Standardization, LED provides expertise in the area of product support, influencing the development and maintenance of these organizations' standards. This engagement determines the efficient and effective product support strategies that increase readiness of our military systems, enabling our soldiers to "win in a complex world." LED remains at the forefront of influence on the product support standards and organizations that are pertinent and essential to DoD and the Army.

LOGSA's *Packaging, Storage, and Containerization Center* is getting ready to begin Change 1 to MIL-STD-129R, "Standard Practice for Military Marking for Shipment and Storage." MIL-STD-129 is frequently cited in DoD contracts to ensure that manufacturers and suppliers provide items that are marked in a standard and uniform fashion compatible with DoD logistics systems. Change 1 will see modifications to the Joint Ammunition/Explosives Packaging Label from the Joint Ordnance Commander's Group, incorporate requirements for the new uniform Procurement Instrument Identifier (contract number) to address the new format and eliminate marking of delivery order numbers;,update shelf-life marking requirements, and make minor editorial changes and corrections.

Tank-Automotive Command

The Tank-Automotive Command (TACOM) has completed MIL-STD-3040, "Arc Welding of Armor Grade Steel," providing DoD, government agencies, and industry with a comprehensive standard for welding of armor grade steel. During the blueprint for change in the 1990s, the standards that covered welding were cancelled leaving no military or industry standards to weld armor grade steel. At that time, a TACOM drawing was developed for contract use in steel armor welding, but this drawing had never been updated and has no engineering guidance for the selection of weld wire. The TACOM Standardization Office collaborated with Ground Systems Survivability, Product Life Cycle Engineering, Center for System Integration, and Army Research Lab. Once the initial draft was completed, two separate coordinations were conducted with approximately 150 entities from DoD, industry, educational institutes, and civilian standardization organizations to produce the final standard. During the coordination effort, TACOM received almost 900 comments from the various reviewers. These comments were reviewed during meetings with various contractors, program offices, and subject matter experts. Developing this standard has taken approximately 5 years, but it has delivered a substantial document that will affect all military systems using welded steel armor.

MRMC STANDARDIZATION INITIATIVES

Within the past year, the U.S. Army Medical Research & Materiel Command (MRMC) has worked with the Army DepSO on a couple of standardization initiatives to improve efficiencies in their contracting efforts:

1. They requested and received approval to stand up a standardization preparing activity (MD2) within MRMC that allows them to work standardization documents and approvals where the expertise resides in-house rather than attempting to get concurrences from an area that has no visibility of their activities.

2. They developed and published a Data Item Description (DID), titled "Research and Development of Medical Products Regulated by the U.S. Food and Drug Administration, (FDA)," to facilitate the acquisition of technical data to support the research and development of drugs, biologics, medical devices, or some component thereof regulated by the FDA. The DID allows for consistency and efficiency of one document rather than developing a document for each solicitation or having a multitude of different but similar documents.

MRMC is the Army's medical materiel developer, with responsibility for medical research, development, and acquisition and medical logistics management. Its expertise in these critical areas helps establish and maintain the capabilities the Army needs to fight and win on the battlefield. It is an advanced developer of FDA-regulated medical products among its many products. Six medical research laboratory commands execute the science and technology program to investigate medical solutions for the battlefield with a focus on various areas of biomedical research, including military infectious diseases, combat casualty care, military operational medicine, medical chemical and biological defense, and clinical and rehabilitative medicine.
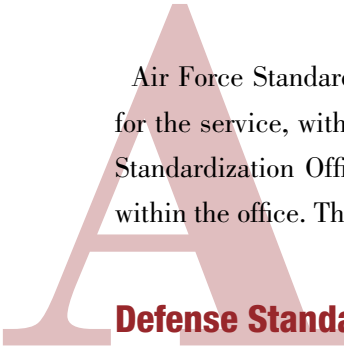
About the Author

Wade Schubring is the Army Department Standardization Officer at Army Materiel Command. He started his career with the Rock Island Arsenal science and engineering department in howitzer production. He worked in private industry as a manufacturing engineering and plant maintenance supervisor. Mr. Schubring also worked for the Army's Joint Munitions Command and Tank-Automotive Command as an engineering supervisor in the following functions: capital investment program, military construction–Army, environmental, facilities and base operations, logistic systems, industrial base, and value engineering.

Plans for the Air Force Standardization Program

By Edward Durell

Air Force Standardization Executive David Walker leads the Air Force Standardization Program for the service, with extensive assistance, guidance, and counsel from the Air Force Departmental Standardization Office. The following is a very concise summary of ongoing and planned actions within the office. The list may be brief, but it represents the office's core focus.

Defense Standardization Council

Our efforts are closely aligned with those of the Defense Standardization Council. Although not an exhaustive list, notable ongoing activities include support of the Human Systems Integration industry standard and updating of standardization documents that are past their scheduled review dates.

Locally

Within the service there are a number of homegrown initiatives that serve two purposes: to bolster the Defense Standardization Program and to assist program offices.

INTERNATIONAL STANDARDIZATION AGREEMENTS

This year we have increased efforts to keep current custodian information for materiel-related NATO standardization agreements and Air and Space Interoperability Council air standards.

PEO-SPECIFIC STANDARDIZATION DOCUMENT LISTS

We have expended considerable effort developing customized lists for each program executive officer (PEO) to consider as they progress through acquisition and sustainment and even disposal. See the article in a previous issue of the *Defense Standardization Program Journal*.

REVIEW OF POLICY DOCUMENTS

If a policy writer wishes to cite a standard, we are there to help. We regularly review all kinds of command media with an emphasis on standardization documents. We ensure that current versions of documents are cited; and in special cases we will recommend including a reference to a standardization document, if it seems appropriate.

Although in the initial planning stages, we are exploring innovative improvements for soliciting feedback from program offices that will be used to improve the standardization program. Of special interest are technical practices regarding the use of standards, specifications, handbooks, and all other document types. We would like to gain insight into the documents being used—whether they are effective, whether changes are needed, and so forth. This exchange of information completes the communication loop and can serve to advise us as we perfect and evolve the universe of available documents.

One thing we never lose sight of is that the standardization program exists to help program offices in their acquisition and sustainment endeavors, ensuring that airmen have what they need to fly, fight, and win ... in air, in space, and in cyberspace.

About the Author

Edward Durell is the Headquarters Air Staff lead for the Air Force Departmental Standardization Office, where he regularly advises the Air Force Standardization Executive. As an Air Force civilian for over 30 years, he has held numerous technical and management positions at both Headquarters and Air Logistics Center functional organizations, and within program offices. These include engineering assignments in facilities, real property infrastructure, and aerospace systems. He is a registered professional engineer.

Standardization and NSN Data Cleansing: Land and Maritime Effort Streamlines Procurements

By Tom Hess and Gary Watson

The Defense Logistics Agency (DLA) Land and Maritime Document Standardization Division has undertaken the effort to evaluate all national stock numbers (NSNs) controlled by a standardization document for which they are the preparing activity (PA). DLA Land and Maritime is currently the PA for more than 10,000 military specifications, standards, and drawings that are referenced by more than 100,000 NSNs. These NSNs are in more than 70 different federal stock classes (FSCs) covering parts from rubber hose, wire, and cable to high-reliability military microcircuits.

Background

Early in 2016, the Document Standardization Division started a program of reviewing engineering support requests on materials covered by military specification devices for which they are the PA prior to military service review. Requests were generated in many cases to items that were either unprocurable or otherwise unidentifiable. Standardization engineers and technicians discovered in many instances that the NSNs had not been properly catalogued with the appropriate military document number or part number. Engineers and technicians also found instances of typographical errors, incorrect part numbers, and obsolete document references that have led to numerous delays and a significant increase in hands-on review of NSNs prior to solicitations. The automated buy system will kick out errors for manual intervention, which delays procurements, increases lead times, and can ultimately create back-order situations for those highly active NSNs.

Forward Thinking

Several weeks of reviewing engineering support requests led to a pattern of these types of actions and a discussion about how to look at the entire national stock system to correct unwanted errors in a methodical yet timely manner. The idea of focusing on one particular FSC did not seem to provide the most efficient solution. The initial evaluation began with looking at those items that had current specification actions during the previous month. The Document Standardization Division averages approximately 135 completed specification projects per month across the MilSpecs and Standards Program, the Standard Microcircuit Drawing Program, the Vendor Item Drawing Program, and the Land and Maritime Drawing Program. By using the list of completed drawings from the previous month, Veterans Affairs associates began researching all of the NSNs associated with each document and taking the appropriate action to correct cataloging and standardization errors.

After the first 6 months, more than 8,000 actions were generated to correct part number, document number, and sourcing information. Updating this information has allowed the automated buy system to generate solicitations for warfighter support without manual intervention, thus reducing delays, decreasing lead times, and ultimately getting the right items to the warfighter.

The sheer volume of errors led DLA Land and Maritime management to focus the preparing activity in making these corrections a high-priority work item. The Document Standardization Division

developed a team of engineers and technicians from across the spectrum of FSCs in an effort to have the expertise to expedite this review. As new team members have been brought on board, they are focusing attention on high-priority NSNs to further support the warfighter. As distressed items are identified, all of the NSNs associated with a specific document are reviewed for accuracy and corrected as necessary.

The Process

Gary Watson, item reduction and standardization expert, is the designated leader of the Document Standardization Division team and has developed a process flow that includes correcting all errors associated with MilSpec NSNs and working with electronic cataloging (E-Cat) to properly code the cataloging for these NSNs. This newly developed review and correction process will streamline the procurement process by allowing solicitations and awards to flow with less or no manual review.

To verify that NSNs are first cataloged correctly and subsequently bought correctly, they first have to be identified that they are associated with a standardization document. Various data sources and techniques are used to identify this relationship. After identification of all NSNs, the team has to then validate the reference number section in the Total Item Record (TIR) for each NSN by comparing the format of the reference number to the format defined in the standardization document. If there is a format issue in the TIR, a cataloging request is made to Defense Logistics Information Services to correct the reference number. If the MilSpec requires qualification, the next step of the process is to ensure that the government designation listed in the Qualified Products Database (QPD) matches the format defined in the standardization document. If the data format doesn't match, a request is made to the qualifying activity to either add or correct the QPD. Ultimately, once all three data sources match, an unencumbered, streamlined acquisition with no manual intervention can be accomplished, expediting the delivery of material to the warfighter (see Figure 1).

Figure 1. Standardization Document NSN Cleansing Flow
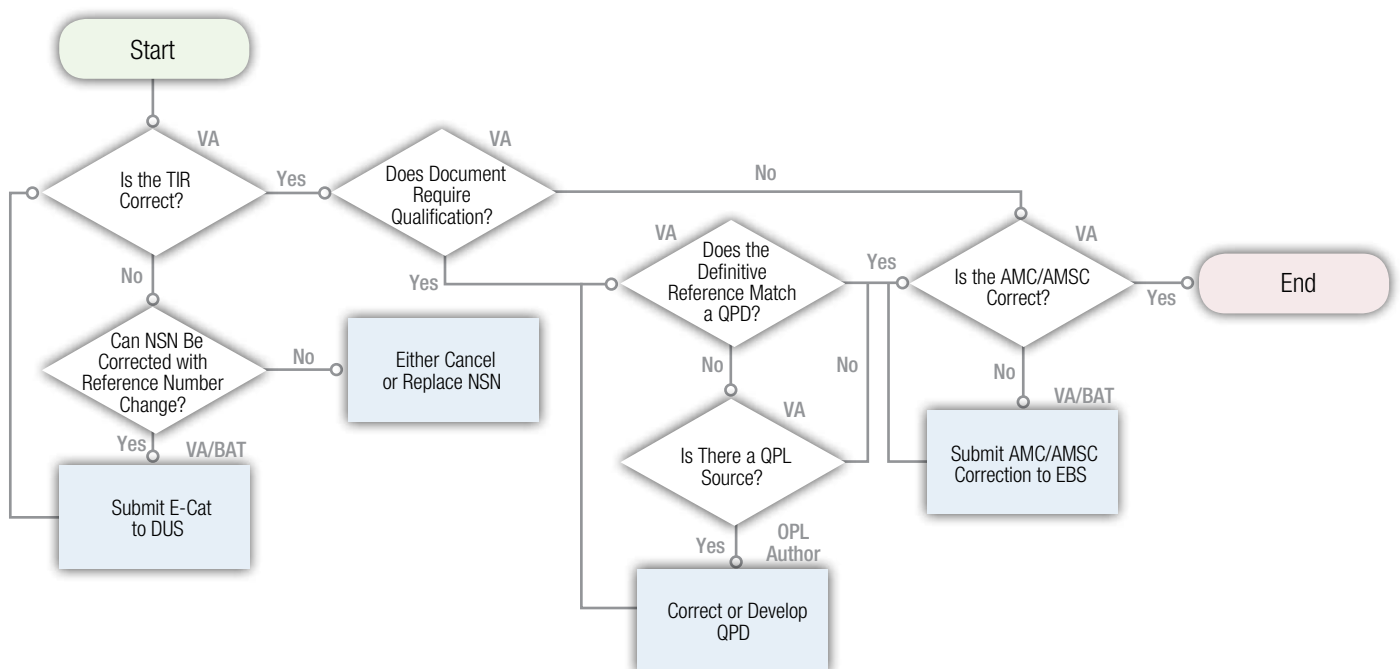
Additional Benefit Captured

There is currently an effort underway to streamline the procurement of NSNs that have qualification requirements. As of today, DLA's system functionality does not store Qualified Products List (QPL), Qualified Manufacturers List (QML), or Qualified Sources List (QSL) information that is needed in the automated procurement processes (solicitation, evaluation, or award). The acquisition specialists have to determine the approved sources or send a pre-award referral to the product specialist. The time to award is increased on purchase requisitions (PRs) for materials where QPL, QML, Qualified Source List of Distributors (QSLD), or Qualified Source List of Manufacturers (QSLM) applies.

To accomplish automated solicitation and automated awards for MilSpecs requiring qualification, a change was needed in SAP to include data on qualified products. Once this change is completed, the time to award on PRs for materials where QPL, QML, QSLD, or QSLM applies will be greatly reduced by automatically soliciting and awarding them using the automated one-time buy process. The new functionality will allow DLA to track QPL, QML, and QSL information more efficiently. For this change to work properly, all of the information associated with each NSN has to be pristine. The work that Mr. Watson and his team are doing to "cleanse" the NSN data will be crucial to the success of the change being made in DLA's computer systems for NSNs that require qualification.

Early Results

As of July 2016, more than 8,516 E-Cat requests have been submitted for 9,616 NSNs reviewed (88 percent) and 81 standardization documents have been reviewed. Mr. Watson and his team continue to refine their process flow and are becoming more efficient in their reviews, which translates into more NSNs with "clean data." As mentioned earlier, the Document Standardization Division is the PA for more than 10,000 military specifications that have more than 100,000 associated NSNs. There is still much to be accomplished; however, early results are showing significant benefits to the DLA Land and Maritime procurement process. The plan for the Document Standardization Division team is to first concentrate its efforts on NSNs that are the most active and have the highest dollar value. This will have the greatest return on investment for the supply chain.

The NSN data cleansing project will play an integral role in the success of auto solicitation and award, especially for those NSNs that require qualification. Over the next several years, this NSN data cleansing process will become part of the normal flow for all standardization projects for which the Document Standardization Division is the PA. The lesson learned through this project is that manual input is necessary but can introduce errors that render the automated process useless. DLA's computer systems are only as efficient as the accuracy of the data they rely upon.

About the Authors
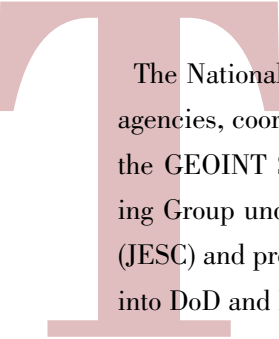
Tom Hess is a supervisor/electronics engineer and the chief of the Active Devices Team at Land and Maritime. His team is the preparing activity for MIL-PRF-38535, MIL-PRF-19500, and MIL-STD-750. Mr. Hess has 30 years of experience in the standardization of microelectronics, semiconductors, and radiation-hardened devices.

Gary Watson has 30 years of item reduction and standardization experience.

Geospatial Intelligence Standards

By Michael Harbaugh
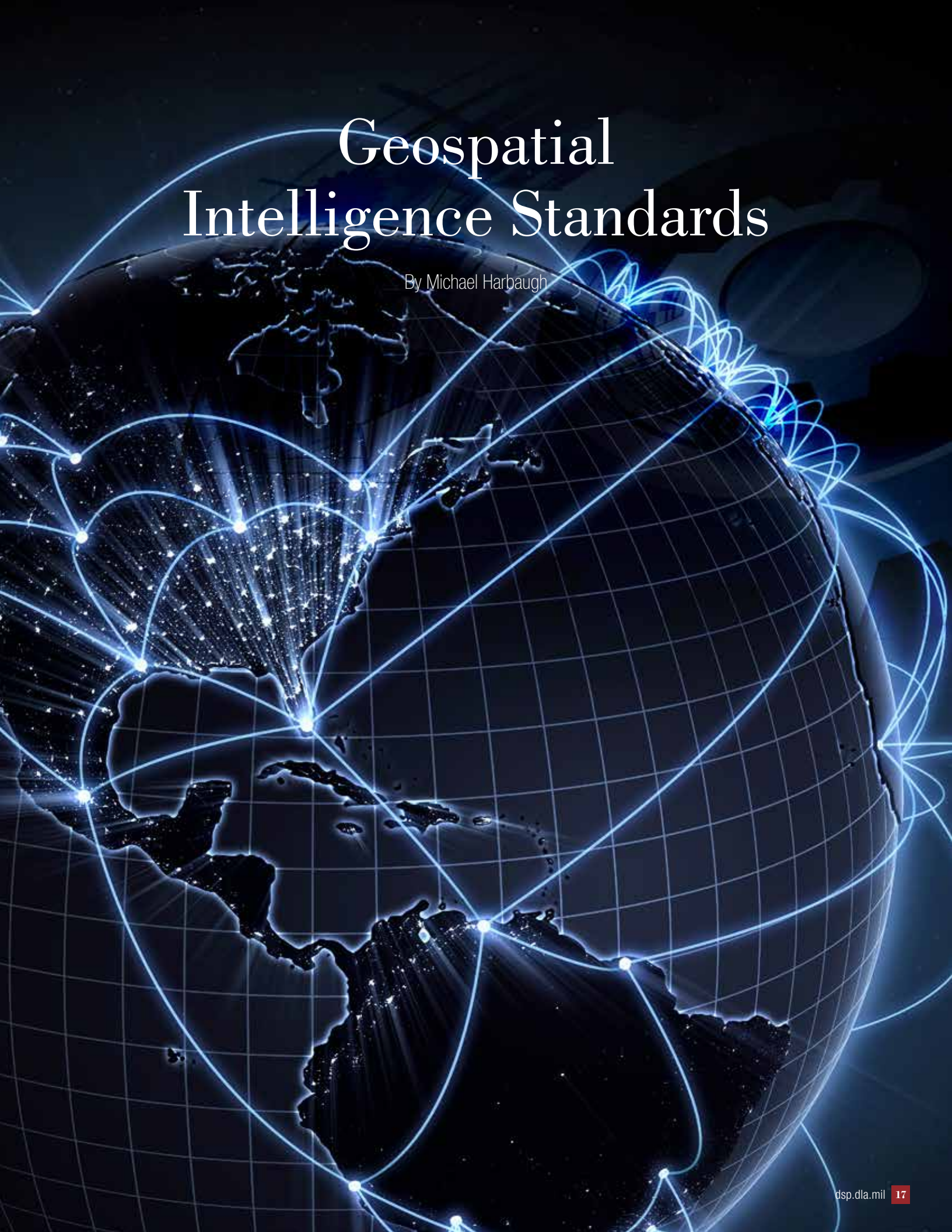
The National Geospatial-Intelligence Agency (NGA), in concert with other DoD departments and agencies, coordinates geospatial intelligence (GEOINT) standards and standardization activities via the GEOINT Standards Working Group (GWG). The GWG functions as a Joint Technical Working Group under DoD and the Intelligence Community (IC) Joint Enterprise Standards Committee (JESC) and provides recommendations regarding the integration of geospatial intelligence standards into DoD and IC enterprise standards baselines.

The GWG emphasizes standards and standardization activities that enable data, product, and service interoperability across the National System for Geospatial-Intelligence (NSG), and it focuses on standards concerning geospatial information and still and motion imagery. Today, the JESC has mandated the use of 139 government and nongovernment geospatial intelligence standards.[1] The JESC cites another 34 as "emerging," with the possibility of being mandated in the future. To facilitate the adoption of nongovernment standards, NGA—along with members of the NSG[2]—developed partnerships with a variety of national and international standards development organizations, including the following:

- The International Organization for Standardization Technical Committee (ISO) Technical Committee 211–Geographic Information-Geomatics

- The American National Standards Institute International Committee for Information Technology Standards

- The Open Geospatial Consortium.

Through active participation in these organizations, NGA and the NSG community have leveraged the knowledge, skills, and talent of the broader geospatial community, which has yielded the following:

- Reduced risk by aligning with industry to address new and emerging technologies

- Expedited technology integration into systems and services through the use of open solutions

---

[1] For a listing of JESC–approved GEOINT standards, go to https://nsgreg.nga.mil/JESC-approved.jsp.

[2] The NSG consists of the armed services, the combatant commands, the intelligence agencies, and federal organizations.

- Improved choice in the marketplace by influencing the development and adoption of open standards in commercial solutions

- Reduced overall system life-cycle costs by reducing or eliminating custom integration through the use of open standards.

NGA emphasizes the need to work collectively with its international partners to develop a common approach to solving shared problems. Without this collaboration, solutions may not be interoperable among nations participating in NATO or allied operations. This, in turn, could reduce multinational forces' speed and efficacy, and it could potentially put those forces at increased risk.

A principle forum for allied standardization has been the Defense Geospatial Information Working Group (DGIWG). Although the DGIWG is not a NATO body, NATO and NATO nations rely on it for technical advice and the provision of standards-based solutions that facilitate the creation, sharing, and use of geospatial information within the alliance. DGIWG standardization documents that meet NATO needs are covered by NATO standardization agreements such as 2592, the NATO Geospatial Information Framework.

A majority of GEOINT standards are either adoptions or adaptations of open standards. Although some mission requirements will dictate specific solutions for government use only, those will be the exception rather than the rule. As NGA continues to partner with standards development organizations, the need for these government-unique solutions will diminish substantially. The following section highlights key GEOINT standardization initiatives that NGA is leading under the oversight of the GWG.

The GEOINT Structured Implementation Profile

To effectively create, share, and use GEOINT across the NSG, NGA created a common data model that integrated feature concepts (real-world entities and phenomena) from multiple disciplines. The data model, known as the NSG Application Schema (NAS), is platform independent and defines the syntactic structure of feature concepts captured by the NSG Entity Catalog (NEC). The NEC, supported by the NSG Feature Data Dictionary (NFDD), provides the semantics for the model by defining attributes, domain values, and associations that one feature concept may have with another. Collectively, the NFDD, the NEC, and the NAS are known as the GEOINT Structure Implementation Profile (GSIP). The GSIP has continued to evolve since its inception in 2007, as new and emerging requirements are addressed. These include adding an object class for devices (e.g., equipment) in 2015 and consumables (e.g., munitions) in 2016.

The NAS provides a clear and logically consistent data schema that may be used in system-specific implementations. It is engineered to support a one-feature-one-time solution, which alleviates the need to collect and store multiple instances of the same feature based on use (e.g., aeronautical, maritime, and topographic), thereby facilitating data exchange between systems with conformant implementations.

To address the human element of conflict, a set of Human Geography (HG) concepts were integrated into the data model (see Table 1). HG uses an interdisciplinary approach to describe spatial and temporal patterns of human behavior in the context of their environment as it applies to GEOINT. NGA is working with its NATO partners to standardize HG concepts to ensure consistent collection and use in multinational operations.

Table 1. Human Geography Concepts and Nature of Information

HG concept	Nature of information
Demographics	Measurable characteristics of a population
Economy	Economic factors that determine how the members of a population support themselves
Education	Educational and literacy characteristics of a population
Health and medical	Health information about a population and the availability of treatment
Groups and organizations	Formal and informal groups within a population, including structure, objectives, and leaders
Ethnicity	Ethnic affiliation and characteristics of a population
Religion	Religious affiliation(s) and characteristics of a population
Language	The language(s) of a population
Communications and media	The means by which information is disseminated, who owns and controls the content, and who has access
Transportation use	Transportation routes and the means by which people and goods circulate within a geographic region
Water supply and control	The supply of surface water and groundwater in a given geographic area, including control and access
Ownership	Ownership of land parcels in a given geographic area
Land use and cover	Information about land use (e.g., industrial, commercial, or residential) for a given area, and its dominant vegetation cover
Cultural heritage	Information about the architecture style, historical and archeological remains, monuments, and sacred places of a given geographic area
Significant events	Information about events that have shaped a population

A new set of semantic standards is planned to replace the NFDD and the NEC in the next 3 years. This new set of standards will enable the publication structured data and the ability for it to be interlinked with data from different sources on the web. It will also consist of appropriate semantic resources to specify domain vocabulary and concepts for human use and for automated exchange between machines. These semantic resources are encoded artifacts containing standardized structures that capture the meaning of the data, a controlled vocabulary to explain terminology, structured sets of terms related based on relationships (i.e., taxonomy), and specifications of concepts in a logic-based language. This language will use properties, a subclass structure, and relationships between terms and meanings specified as formal concepts that will be captured in the NSG Enterprise Ontology.

Metadata

The NSG Metadata Foundation (NMF) is a multipart standard adapted from ISO standards 19115-1, "Geographic Information–Metadata Part 1: Fundamentals," and 19115-2, "Geographic Information–Metadata Part 2: Extensions for Imagery and Gridded Data." The NMF is compliant with the ISO standards but includes extensions and values required by the defense community, such as security markings. NGA has also worked with and supported standardization efforts in NATO and the DGIWG to ensure interoperability with our allies, including NATO Standardization Agreement 2586, NATO Geospatial Metadata Profile, and the DGIWG Metadata Foundation document.

Integrating the metadata into the data model, to form a single comprehensive logical model for the NSG, is an ongoing initiative in the development of NAS v8.0. The metadata elements defined by the NMF Ed. 3.0 (August 2016) will be included in NAS v8.0 when it is released in late 2016. This new version of the NMF will serve as the mandatory core for GEOINT metadata; will be explicitly applicable to services, data sets, and series; and will meet the mandatory minimum to support the government's cloud migration.

Geopolitical Entities, Names, and Codes

The Geopolitical Entities, Names, and Codes (GENC) standard is the U.S. government profile of ISO 3166, "Codes for the Representation of Names of Countries and Their Subdivisions." The GENC defines codes for the representation of names of geopolitical entities and their subdivisions that have been approved by the U.S. Board of Geographic Names and captures unique U.S. government requirements, including restrictions in recognition of the national sovereignty of a country, identification and recognition of geopolitical entities not included in ISO 3166, and the use of names of countries and country subdivisions that have been approved by the U.S. Board of Geographic Names. This standard supersedes Federal Information Processing Standard (FIPS) 10-4, "Countries, Dependencies, Areas of Special Sovereignty, and Their Principal Administrative Divisions." Although FIPS 10-4 was withdrawn by the National Institute of Standards and Technology on September 2, 2008, NGA continued to maintain its content in an online registry known as Geopolitical Entities and Codes (GEC) until December 31, 2014, GEC was retired on March 31, 2015.

The code entries of the GENC standard reside in an online registry and may be queried for ease of use. See https://nsgreg.nga.mil/genc/discovery.

Elevation Surface Models

In collaboration with the DGIWG, NGA developed the Defense Gridded Elevation Data (DGED) Product Implementation Profile. The DGED defines a uniform, orthogonal, grid-based geospatial elevation model for a wide range of geospatial resolutions, including levels 1 and 2 as covered by

MIL-PRF-89020B, "Digital Terrain Elevation Data" (DTED). This standard, an implementation profile of ISO standards and technical specifications, enhances elevation data tailored to meet specific needs. Unlike traditional DTED products, the DGED product standard has several encoding options to choose from—such as GeoTIFF—depending on user needs. Use of this standard is expected to increase interoperability with and between organizations producing and using elevation data.

Geospatial Web Services

Standards for geospatial web services, as well as metadata, are focal areas for NGA, as these standards are key to the discovery, retrieval, and use of data and products—especially those that may be served up by nontraditional producers and suppliers stemming from the "Internet of things." One way in which NGA is addressing this standardization need is through its participation in the Open Geospatial Consortium (OGC) as a strategic member, working collaboratively with its membership[3] to create open standards that enable geospatial information on the web.

To ensure that these standards perform according to design, NGA is one sponsor of the OGC's annual test bed. The test bed is designed to evaluate the interoperability of internal OGC standards and, depending on sponsor requirements, the interoperability of standards developed externally from the OGC process. The test bed provides valuable input into the applicability of those standards in a real-world scenario, usually set by the sponsors. Validation of standard readiness provides valuable benefit in the procurement process. Recent test bed activities have included Web Feature Service 2.0, Web Map Service 1.3, and Web Coverage Service 2.0. Among current efforts, NGA is working within the DGIWG to develop and test implementation profiles for the OGC's GeoPackage 1.0 and Web Map Tile Service 1.0, which are expected to be completed in the 2017–2018 time frame.

Summary

The standards highlighted in this article represent a handful of NGA standardization initiatives that have been achieved through collaborative efforts with NSG members and partners. These standards provide an enterprise solution that enables different systems with different data to be interoperable

---

[3] As of August 17, 2016, the OGC's membership consists of 527 companies, government agencies, and academia from around the globe.

with one another, provided the implementations are conformant. NGA will continue to proactively work with industry partners to leverage new and emerging technologies and seek opportunities to engage and influence standardization efforts in the civil and defense domains. New standardization will focus on embracing technological advances—for example, 3D imaging, data on mobile devices, and new phenomenologies—to give our warfighters and decision makers the GEOINT needed, in the manner needed (i.e., format), when it's needed.

About the Author

Michael Harbaugh is a data architect with NGA with more than 20 years of experience in the standardization field. He serves as NGA's Departmental Standardization Officer to the DSP, working with civil and defense partners to address geospatial intelligence standardization requirements.

Program News

Topical Information on Standardization Programs

DSPO's Trudie Williams Receives Meritorious Service Award

Trudie Williams of the Defense Standardization Program Office was presented with the American National Standards Institute's Merito-

(From left) Mr. Kevan Lawlor, chair, ANSI Board of Directors, Ms. Trudie Williams, DSPO, and Mr. Philip Piqueria, past chair of the U.S. National Committee of the International Electrotechnical Commission.

rious Service Award at the 2016 ANSI Awards Reception, Banquet, and Ceremony. The ceremony was held in conjunction with World Standards Week on October 26, 2016, at the Fairmont in Washington, D.C. The award recognizes Ms. Williams' work as the principal for the department's nongovernment standards program, her work with DoD activities and federal agencies to advance reliance on nongovernment standards, and her work participating on various interagency committees formed to establish policy encouraging participation and development of nongovernment standards. As an advocate for DoD presence within the nongovernment standards community, she has held various management and voting positions on technical and policy committees. This is a well-deserved award for Ms. Williams and we congratulate her on this prominent recognition.

DMSMS 2016 Achievement Awards Presented

The DMSMS achievement awards were presented on November 30, 2016, during the DMSMS Conference in Denver, CO. The awards seek to recognize individuals and teams from the government who are most responsible for significant achievements in proactive DMSMS management and implementation. This year, the DMSMS Working Group received nominations demonstrating outstanding performance and varying levels of achievement in mitigating DMSMS.

The following individuals and teams were selected to receive achievement awards for 2016:

INDIVIDUAL ACHIEVEMENT

▌ Captain Marc Bleha, USAF, Air Force Nuclear Weapons Center, ICBM Systems Directorate, Air Force Materiel Command

TEAM ACHIEVEMENT

▌ NAVSUP Weapon Systems Support DMSMS Team, Naval Supply Systems Command

▌ AEGIS Weapon System DMSMS Air Dominance Department, Naval Surface Warfare Center, Port Hueneme Division

LIFETIME ACHIEVEMENT

▌ Mr. Alex Melnikow, DMSMS Lead, Defense Standardization Program Office, ODASD System Engineering.

Congratulations to the winners!

Robert Gold, director of the DASD(SE) Engineering Enterprise, presents Captain Marc Bleha, U.S. Air Force, with the DMSMS Individual Achievement Award. Captain Bleha received the award for his contributions to the success of the Stock Inventory and Maintenance Production Logistics Enterprise tool.

Robert Gold and Robin Brown present the DMSMS Team Achievement award to the AEGIS Weapon System DMSMS Air Dominance Department of the Naval Surface Warfare Center, Port Hueneme Division, for its demonstration of being a world-class DMSMS team focused upon optimized post-production support and life-cycle sustainment.

The NAVSUP Weapon Systems Support DMSMS Team, Naval Supply Systems, received the DMSMS Team Achievement Award for providing exceptional DMSMS management encompassing active engineering department involvement to create technical improvements. Shown here with Robert Gold and Robin Brown, DMSMS head.

Mr. Alex Melnikow accepts the DMSMS Lifetime Achievement Award for his career achievements as the DMSMS lead, which brought the entire DoD DMSMS community together in unprecedented ways, making collaboration, information sharing, and effective communications a standard way of doing business.

Events

Upcoming Events and Information

November 28–December 1, 2016, Denver, CO
DMSMS 2016

The 2016 Diminishing Manufacturing Sources and Material Shortages Conference will be conducted simultaneously with the Defense Manufacturing Conference, joining together their exhibitions to bring participants a diverse knowledge base in the manufacturing world and more networking opportunities, all in one location. While each conference will have its own unique agenda, focus its program to its specific conference audience, and have a separate registration procedure to attend, one registration fee will give access to both conferences. DMSMS 2016 registration is open to defense industry, military, and government personnel. See http://www.dmsmsmeeting. com/pages/registration.html.

December 5–8, 2016, Albuquerque, NM
2016 DoD Maintenance Symposium

The mission of the 2016 DoD Maintenance Symposium is to create an environment that enables attendees to share relevant information, identify critical issues, discuss key topics, and increase their awareness of Department of Defense maintenance initiatives. Join military, government, and industry leaders and maintainers from all levels at this distinctive, first-class event—the maintenance community's primary venue for networking

and content sharing. For more information or registration details, go to http://www.sae. org/events/dod.

January 25–27, 2017, Washington, DC
SAE 2017 Government/Industry Meeting

This forum provides opportunities for technical authorities from government, industry, and academia who are leading regulations, pending legislation, and advanced testing and technology to address the issues influencing future decision making within the industry. For more information, go to http://www.sae.org/events/gim/.

March 14–15, 2017, Knoxville, TN
SAE 2017 Additive Manufacturing Symposium

Get the latest information on innovations, technical advances, products, applications, and market issues. Deepen your knowledge of the challenges and solutions associated with the advancement of additive manufacturing (AM) technologies and processes. Network with the diverse community working on AM and with the manufacturers that implement and use AM. Identify new applications and potential new product design opportunities, and gain an understanding about designing products for AM. For more information, go to http:// www.sae.org/events/ams/.

Events

Upcoming Events and Information

June 5–9, 2017, Denver, CO
AIAA Aviation Forum

The AIAA Aviation and Aeronautics Forum and Exposition is the only aviation event that covers the entire integrated spectrum of aviation business and technology. Twelve technical conferences and a new demand for an unmanned UAS symposium in one location make this a must-attend event in 2017! Industry, academia, and government leaders will share their perspectives on the new challenges, future opportunities, and emerging trends in the global aviation industry. Plenary sessions examine some of the most critical issues in aviation today. The Forum 360 panel discussions build on the themes and discussions of each day's opening plenary session, adding a layer of content and context that enhances the value of your forum experience. An innovative and extensive technical program provides the latest in innovative research and developments that will drive advancements in aviation. For more information, go to http://www. aiaa-aviation. org/program/.

People

People in the Standardization Community

Farewells

Jim Dwyer, principal deputy of the Army Materiel Command (AMC), G-3/4, retired September 30, 2016, after more than 40 years of service as both a civilian and an Army officer. Mr. Dwyer gives most of the credit of his success to his family and colleagues, but he leaves behind a legacy at AMC, and his shoes will be tough to fill. Congratulations on your well-earned retirement!

Mary Murray, general supply specialist for the Defense Logistics Agency (DLA), retired on October 31, 2016. She began her government career in November 1987 as a printing clerk in the Navy Publishing and Printing Service's planning office, currently known as DLA Document Services. In 1993, she began processing standardization projects with the Defense Standardization Program. After a short time, she began beta testing the ASSIST program with DLA Columbus on the Electronic Document Submission. Ms. Murray has been processing completed standardization documents prepared and submitted for publication into ASSIST with the Defense Standardization Program/ASSIST for 23 years. She has also worked on maintaining the SD-1, inventory of the classified/secret military documents in the vault, as well as various standardization projects. Her dedicated service is greatly appreciated and she will be missed in the DSP community.

Edith Burns, general supply specialist for the Defense Logistics Agency, will retire on December 30, 2016. She began her government service at the Navy Publishing and Printing Service in January 1987. She processed customer military specifications and standard warehouse orders from the Navy Print on Demand System in the Order Entry department. Ms. Burns has been working with the Defense Standardization Program/ASSIST for over 21 years, starting with processing paper standardization project submissions and presently processing standardization documents prepared and submitted for publication into ASSIST. She has also worked numerous standardization projects and tasks. Her service to the ASSIST program and to the DSP community is greatly appreciated, and she will be missed.

Upcoming Issues
Call for Contributors

We are always seeking articles that relate to our themes or other standardization topics. We invite anyone involved in standardization—government employees, military personnel, industry leaders, members of academia, and others—to submit proposed articles for use in the *DSP Journal.* Please let us know if you would like to contribute.

Following are our themes for upcoming issues:

Issue	Theme
January/March 2017	Space Standards
April/June 2017	Standardization Stars
July/September 2017	Warfighter Support

If you have ideas for articles or want more information, contact Nicole Dumm, Editor, *DSP Journal*, Defense Standardization Program Office, 8725 John J. Kingman Road, STOP 5100, Fort Belvoir, VA 22060-6220 or e-mail DSP-Editor@dla.mil.

Our office reserves the right to modify or reject any submission as deemed appropriate. We will be glad to send out our editorial guidelines and work with any author to get his or her material shaped into an article.